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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,200	06/01/2006	Shinichiro Takashima	292044US0PCT	3200

22850 7590 02/22/2011
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EXAMINER

THAKUR, VIREN A

ART UNIT	PAPER NUMBER
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1782

NOTIFICATION DATE	DELIVERY MODE
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02/22/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/581,200	Applicant(s) TAKASHIMA ET AL.	
	Examiner VIREN THAKUR	Art Unit 1782	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 14, 16, 18-23, 26, 28 and 29 is/are pending in the application.
- 4a) Of the above claim(s) 1-11, 20 and 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12, 14, 16, 18, 19, 22, 23, 26, 28 and 29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/29/2010</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 29, 2010 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 12,14,16,18,19,22,23,26,28 and 29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1 and 22 recite the limitation "wherein a weight ratio of activated carbon to acid clay or activated clay is from 1 to 10." This limitation is NEW MATTER. This limitation reads that the ratio of activated carbon to active or acid clay is 1:1 to 10:1. It is noted, however, that page 17, paragraph 0037 of applicants' specification indicates

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that the "weight ratio of activated carbon to acid clay or activated clay is approximately from 1 to 10 of acid clay or activated clay to 1 activated carbon, " which indicates that ratio of active carbon to active or acid clay is 1:1: to 1:10.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 12,14,16,18,19,22,23,26,28 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claims 12 and 22 recite the limitation, "a 91/9 to 97/3 by weight mixture of an organic solvent comprising ethanol and water." This limitation is not clear as to which of 91 or 9 and 97 or 3 refers to the ethanol and the water.

Claim 29 recites that "a weight ratio of activated carbon: acid clay or activated clay is from 1:1 to 1:6." This limitation fails to further limit the claim from which it depends, which recites a ratio of activated carbon to clay of 1:1 to 10:1. Claim 29 is also indefinite since the range for the weight ratio of active carbon to active or acid clay falls outside of the range recited in claim 12.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 12, 16, 22 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funahashi et al. (JP2000-166466) in view of Katz (US 4324840), Klima et al. (US 4976979), and Ito et al. (JP2002-153211) and in further view of Yuan (CN1421426) and Chang et al. ("Separating of catechins from green tea using carbon dioxide extraction"). A translation of JP2000-166466 has been included with this Office Action.

Regarding claims 12 and 22, Funahashi et al. teaches obtaining a green tea extract (see at least, paragraph 0016 of the translation), by extracting green tea using water extraction (see at least, paragraph 0028 and 0029 of the translation). After this primary extraction, Funahashi et al. teaches extraction with an organic solvent such as ethanol (see at least, paragraph 0031 and examples 1, 5 and 6), and further teaches employing an adsorbent that has been recognized by the art to aide in removing caffeine, such as activated clay (see at least, paragraph 0033 of the translation).

Claims 12 and 22 differ from Funahashi in specifically reciting that the green tea extract is contacted with both activated carbon and acid or active clay.

Nevertheless, it is noted that Katz teaches that a combination of activated carbon and clay can both be used for the purpose of removing caffeine (column 6, lines 26-30) from an aqueous caffeine containing solution, such as tea (column 2, lines 23-26). Klima further evidences that activated clay and activated carbon can be employed as adsorbents for the purpose of removing caffeine (column 2, lines 29-32). Ito et al. also teaches employing a combination of activated carbon and clay for absorbing tea extract components (see at least paragraph 0020-0021, 0045 of the machine translation) for the purpose of removing astringency and for removing Therefore, the art teaches that activated clay and activated carbon are conventional adsorbing materials that the art has conventionally used to lower the levels of caffeine from a tea extract. Since Funahashi et al. already teaches an activated or acid clay for the similar purpose of reducing the caffeine levels in the green tea extract, to therefore modify Funahashi et al. and employ a combination of absorption agents such as activated carbon and activated clay, which the art has already recognized can be used to reduce the levels of caffeine would have been an obvious result effective variable, routinely determinable by experimentation depending on the degree of removal of caffeine desired.

Regarding the limitation that the acid or activated clay being present at between 2.5 to 25 weight parts based on 100 weight parts of the solvent and water, it is noted that Funahashi et al. teaches in examples 5, 6 and 9, that 15 grams of the activated clay

were added combined with 300 ml of the organic solvent/water composition. This is equivalent to 5 weight parts of clay per 100 weight parts of solvent.

Therefore, claims 12 and 22 differ from Funahashi in the particular amount of ethanol and water present. Specifically, claim 12 recites that the ethanol/water solvent is present at 91/9 to 97/3 by weight of organic solvent and water.

It is noted however, that Yuan teaches contacting a green tea extract with 95% aqueous ethanol and an adsorbent, such as activated carbon, for the purpose of removing caffeine and removing color (see at least, page 7-8 of the translation). With regard to Yuan, the green tea extract is that which has been produced prior to the addition of the 95% ethanol and the activated charcoal. Yuan further teaches employing activated charcoal (i.e. activated carbon) for this same purpose. Additionally, Chang teaches using 95% ethanol for the purpose of producing an extract having lower levels of caffeine (see at least table 2, where the 95% ethanol had lower levels of caffeine while also having higher levels of total catechins). Therefore, since the art already teaches employing a combination of an organic solvent and water for the purpose of facilitating treatment of the green tea extract, the particular amount of organic solvent employed, such as 95% ethanol and 5% water, would have been an obvious result effective variable, routinely optimized by experimentation for the purpose of removing the desired impurities from the green tea extract, such as caffeine.

Claims 12 and 22 also differ from this combination in employing a ratio of activated carbon to acid clay or activated clay from 1 to 10. This reads on a ratio of 1/1 to 10/1 of activated carbon to acid or active clay.

It is noted however, that the art clearly teaches employing both clays and activated carbon for the purpose of removing components that cause discoloration to the tea extract and to remove caffeine. As an example, Yuan even teaches that activated charcoal can be added improve the product color (see page 6, line 7 of the translation). Ito et al. further teaches where 10.6g of activated carbon has been employed per 150g water (i.e. solvent). This is equivalent to 7 parts active carbon per 100 parts solvent. Together, the art teaches using activated clay and activated carbon together and teaches employing 5 parts activated clay per 100 parts solvent, and 7 parts active carbon per 100 parts solvent. Therefore, using active carbon and activated clay together would have resulted in a ratio of 1.4. Additionally, since the art also teaches employing activated carbon and acid or activated clay together for the same purpose as applicants' to thus employ a particular amount of activated carbon compared to acid or activated clay would thus have been an obvious result effective variable, routinely determined through experimentation for the purpose of achieving the requisite removal of the undesired components in the tea extract. That is, it is seen to be within the capabilities of one having ordinary skill in the art to experiment with and employ equal parts of both the activated carbon and the activated or acid clay for the purpose of achieving the requisite caffeine removal and color, especially since the art teaches that both activated clay and activated carbon can be employed for this same purpose.

Regarding claim 29 which recites that the ratio of active carbon to acid or active clay is 1:1 to 1:6 it is noted that since the art already teaches employing various

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amounts of active carbon and acid or active clay, that to experiment with the particular amounts of each would have been within the capabilities of one having ordinary skill in the art, for the purpose of achieving the desired removal of caffeine and other discoloring components. In view of the rejection of claim 29 under 35 U.S.C. 112, second paragraph, it is noted that the art essentially teaches employing similar amounts of each of active carbon and acid or active clay (i.e. 5 parts per 100 parts solvent of active clay and 7 parts per 100 parts active carbon). Also, since the art recognized that the carbon and clay can be employed for adsorbing various components of tea extracts that relate to caffeine and color, to thus modify the amounts of the clay and carbon adsorbents to achieve a particular amount of adsorption of caffeine and color components from tea extract would have been an obvious result effective variable within routine experimentation of one having ordinary skill in the art.

Regarding the particular amount of non-polymer catechins in the low-caffeine green tea extract, it is noted that the claim recites the steps for achieving a low-caffeine green tea extract having a particular amount of non-polymer catechins. Therefore, if the steps of treating with an organic solvent and water, activated carbon and acid clay or activated clay are obvious, then the particular product produced from the process would also have been an obvious result of the process. In any case, Funahashi teaches 80% or more polyphenols (see paragraph 0026) which includes catechins (paragraph 0024 and 0032), and Yuan teaches high catechin content such as greater than 70% by employing an ethanol/water solvent and activated carbon treatment.

Regarding claim 16, which recites that the green tea extract is brought into contact with the clay and then into contact with the activated carbon, it is noted that the particular order of contact/absorption using the clay and the carbon would have been a function of the particular pore sizes of each of the clay and the carbon, for instance. Once the art taught employing a combination of adsorbents, the particular order of absorption would have been an obvious result effective variable, routinely determinable by experimentation.

9. Claims 14 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 12, 16, 22 and 29, above, and in further view of Tsai et al. (US 4935256).

Claim 14 recites that the green tea extract is dissolved in the mixture of organic solvent and water and is then brought into contact with activated carbon and the clay. It is noted that Funahashi et al. teaches contacting a green tea extract with an ethanol solution. Funahashi et al. teaches sequentially extracting green tea using a first extraction technique and then a subsequent extraction using an aqueous ethanol solution. Therefore, Funahashi et al. does not explicitly teach dissolving the first extracted green tea extract into the second extraction liquid but It would appear that this would also have resulted in dissolution of the green tea extract. It is noted however, that whether one chose to first dry the green tea extract into a powdered form and then combine into the aqueous organic solvent solution would nonetheless have been an obvious matter of choice and/or design. In any case, it is noted that Tsai et al. teaches

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that it was a conventional concept to first employ a dry green tea extract which was subsequently dissolved in an organic solvent, for the purpose of further extracting the green tea (column 4, lines 39-43).

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 12, 16, 22 and 29, above, and in further view of Clausi et al. (EP0167399), Wolnzach (DE3414767) and Wang (CN1141727).

Regarding claim 18, it is noted that the claim is not clear as to whether it is the “raw material” or the leaves from the genus *Camellia* that have been contacted with supercritical carbon dioxide. Regarding the former, it is noted that the use of supercritical carbon dioxide as well as adsorbents has been well recognized in the art, for the purpose of decaffeinating products, as evidenced by Klima (see example 1 and column 3, lines 18-23 and lines 24-31). Regarding the latter, the combination as applied to claims 12, 14, 16, 17 and 22 appear silent in this regard. Additionally, however, Clausi et al. teaches a green tea leaf that has been treated with supercritical carbon dioxide (see example 1 and example 2). Although Clausi et al. discloses fermenting the green tea leaves (to thus produce a black tea flavor), if one did not desire a black tea flavor but rather desired a green tea flavor, it would clearly have been obvious to have eliminated the fermenting and firing steps. In any case, Clausi et al. teaches that it has been conventional to perform an extraction (by hot water) using tea leaf that has been treated with supercritical carbon dioxide. Wolnzach also teaches the

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concept of producing a dried green tea (see step "ii" of the abstract), which is achieved after treating the leaves with supercritical carbon dioxide (i.e. pressures and temperatures above carbon dioxide's critical point of 31.1°C and 72.9 atm). Wang also appears to teach treating green tea leaves with supercritical carbon dioxide and subsequently performing an extraction after this treatment (see page 12 of the translation "High-grade green tea is made with extra care to embodiment (four)"). It is noted that Wang also teaches what appears to be tea leaves, which have been treated with supercritical carbon dioxide, which result in improved flavor (see top of page 12 of the translation). Funahashi et al. is similar to these references in that Funahashi also first employs a hot water extraction with the subsequent decaffeination steps (see paragraph 0031 and 0033 of the machine translation). Once the art recognized performing an extraction using tea leaves that have been treated with supercritical carbon dioxide, to therefore modify the combination and employ a conventional green tea leaf from which to further employ activated carbon and clay for further removal of caffeine would thus have been obvious to one having ordinary skill in the art.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 12, 16, 22 and 29, above and in further view of Yumoto et al. (JP10-004919), Tsai (US 4946701) and Niino et al. (US 20030185950).

Claim 19 recites that the low-caffeine green tea extract has a ratio of catechins to caffeine of 25 to 200. The previous combination teaches low caffeine content in the green tea extract but is silent as to the particular ratio. Regarding this limitation, it is

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noted that Yumoto teaches filtering a green tea extract such that the extract has low amounts of caffeine which still maintaining the desired amount of catechins (see paragraph 0001 of the translation, for instance). Additionally, Yumoto teaches that caffeine has useful physiological functions but also results in an intake of caffeine that can result in negative effects such as appetite loss, and headaches for instance (see paragraph 0004 and 0020 of the translation). In one example, Yumoto teaches that the extract, which after filtration is 69grams, has 39.8% catechins and 0.8% caffeine in the tea extract. This results in a ratio of catechins to caffeine of 49.75. $((69 \times 39.8/100)$ divided by $(69 \times 0.8/100))$. Yumoto et al. teaches that this extract can then be used in beverages (see paragraph 0044, for instance). Yumoto even teaches employing activated carbon for removing caffeine. Additionally, Tsai also teaches that a ratio of catechins to caffeine of 30 to 1 was desirable. Therefore, to modify the combination and achieve a particular conventional ratio of catechins to caffeine would thus have been obvious to one having ordinary skill in the art, for the purpose of achieving the desired effects of caffeine without the negative physiological effects from caffeine. It is noted that Niino et al. has only been cited as evidence that caffeine can complex with polyphenols (i.e. catechins) that have been oxidized and can thus result in an alteration of the color in the beverage (see paragraph 0006). Therefore, to lower the amount of caffeine would further have been obvious to one having ordinary skill in the art, for the purpose of preventing this change in color due to complexing of polyphenols with caffeine. Additionally, however, to still keep an amount of caffeine in the beverage would have been obvious to the ordinarily skilled artisan in view of the references

above, which teach that an amount of caffeine has been desirable for its physiological effects.

12. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 12, 16, 22 and 29 above, and in further view of Nakamura et al. (JP 06-142405).

Claim 23 recites that the clay is used in an amount such that the ratio of the clay to the non-polymer catechins ranges from 0.9 to 5. The claim differs from the combination in this regard. It is noted however, that the particular amount of clay would have been a function of porosity of the clay for absorption of the undesired components of the green tea extract as well as the desired degree of removal of these components that would have been desired, as well as the particular amount of green tea extract that is being treated. For instance, if it was desired to retain a particular amount of caffeine, it would have been obvious to have used less of the clay thus lowering the surface area contact between the green tea extract and the clay, for removal of these caffeine components. Also, based on the amount of green tea extract present, it would have been obvious to one having ordinary skill in the art that a particular amount the adsorbent such as clay would have been required. Therefore, based on the particular desired effectiveness of the clay employed as well as the particular amount of green tea extract present, the particular ratio of the clay to the catechins present would have been an obvious result effective variable, routinely determinable by experimentation for the

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purpose of effectively removing the desired amounts of caffeine and other undesired components from the green tea extract.

Regarding the limitation of acid clay, it is noted that the combination as applied to claim 12 already teaches employing a substance such as activated clay but the claim differs in reciting employing acid clay.

Nakamura et al., however, teaches that both activated clay and acid clay can be employed as the adsorbent for the purpose of reducing the caffeine content of green tea (paragraph 0004 - see "green tea" and "acid earth"). Since both acid clay and activated clay have been employed for reducing the caffeine content of green tea, to thus modify the previous combination and employ acid clay would have been an obvious substitution of one conventional caffeine absorbent for another conventional caffeine adsorbent.

13. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references applied to claims 12, 16, 22 and 29, above and in further view of Kuraraycoal, as evidenced by Okamoto et al. (US 4026795) and Inagaki et al. (US 5393329).

Regarding claim 26, the combination as applied to claim 12 already teaches the use of activated carbon but is silent as to the claimed pore volume. It is noted however, that applicants employ a commercially available activated carbon, such as KURARAYCOAL GLC. It is noted that Kuraraycoal has been cited as evidence that it has been conventional to use KURARAYCOAL GLC as an adsorbent for removal of

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materials from a liquid phase. This document as well as Okamoto et al. teach that activated carbon facilitates removal of color and for refining of intermediate and final product (see column 1, lines 15-23 and Example 2 on column 8, lines 35-57).

Regarding the pore volume, since KURARAYCOAL GLC is the same material that applicants have employed, it would thus have had the claimed pore volume. In any case, Inagaki et al. has been relied on as further evidence that KURARAYCOAL activated carbon has a pore volume of 0.65, which thus falls within the claimed range (see table 1). Obviously, the particular pore-volume would thus have been a function of the degree of removal of the undesirable components, as well as based on the size of the components to be removed from the liquid. To therefore employ a particular conventional pore volume to the activated carbon would thus have been an obvious result effective variable, routinely determined through experimentation, especially since the art has recognized employing activated carbon for producing low-caffeine green tea extract.

14. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 12, 16, 22 and 29, above and in further view of Hatano et al. (EP1120379).

Regarding claim 28, the combination as applied to claim 12 teaches the use of activated or acid clay, but appears silent as to the particular surface area, as recited in claim 28. It is noted however, that Hatano et al. teaches that activated clay adsorbents (see paragraph 0009), wherein the clay has a surface area within the claimed range

(see table 1 on page 13). Hatano et al. further teach that the surface area is also related to the particle size and pore volume (paragraph 0033-034 and 0045).

Nevertheless, Hatano also teaches a pore volume which results in the desired affinity to the material to be adsorbed (see paragraph 0034-0035). Since activated clay having the claimed surface area has been conventionally employed as an adsorbent, to thus modify the combination and employ activated clay having a surface area of $300\text{m}^2/\text{g}$ would thus have been an obvious result effective variable, routinely determined by experimentation, for the purpose of achieving the desired affinity to the material to be adsorbed.

Response to Amendment

15. The declaration filed on December 29, 2010 under 37 CFR 1.132 has been considered but is ineffective to overcome the rejections of record. It is noted that the table in the declaration appears to be missing a column "Comparative Example 1 in the present specification" which was reproduced on page 10 of applicants' response. In any case, it is noted that the results shown in the declaration of December 29, 2010, only provide examples of the ratio of activated carbon to either of clay or acid clay within the claimed range and then a comparative example where a ratio does not exist, per se, since only one adsorbent, acid clay has been employed. Without providing data for a ratio which fall outside of the range when both active carbon and either of acid or active clay have been employed, the showing in the declaration is not sufficient for overcoming

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the rejection. It is further noted that the comparative example in the declaration indicates that the assessment of the purified product is that the "color deteriorated and precipitation occurred." It is noted however, that this example does not employ any active carbon and the art recognized that active carbon aides in removing caffeine and components that would negatively affect the color. Therefore, it is not seen as unexpected to also include active carbon to further improve the caffeine content and the color of the purified product.

16. On page 15 of the response, applicants assert that there is no suggestion by Funahashi et al. to use 91-97% organic solvent in water to reduce caffeine content and keep catechin content high and maintain good color.

It is noted however, that Funahashi already teaches the use of adsorbents for the purpose of removing impurities and caffeine from green tea extract (see paragraph 0033 of the translation). Also, it is noted that the art teaches employing both activated carbon and activated clay for the same purposes as applicants, for maintaining a desired color and for removing caffeine. Furthermore, it is noted that it would have been obvious to one having ordinary skill in the art that since the presence of caffeine can result in the complexing of caffeine with other components in green tea which would result in a change in the color, that to remove caffeine would have been advantageous for the purpose of preventing this change in color. Therefore, it is noted that the teachings of the art reasonably lead one having ordinary skill in the art to not only employ 95% ethanol and 5% water but to employ together both activated carbon and

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acid or activated clay for applicants' purpose. The art even teaches the claimed amount of both the activated or acid clay and the activated carbon as recited in claims 12 and 22. Therefore, one having ordinary skill in the art would have been reasonably able to employ particular amounts of acid or activated clay and activated carbon as well as the organic solvent and water composition for the purpose of achieving the desired caffeine removal and desired color to the green tea extract.

17. On page 16 of the response, applicants assert that there is no disclosure in Katz of using both activated carbon with an acid or activated clay and as such an enhanced removal of caffeine can not be suggested.

It is noted however, that Katz does indeed teach that both activated carbon and clay can be employed in combination for the purpose of removing caffeine (see column 6, lines 26-30 - "combinations of these"). Also, Ito et al. also teach using both clays and activated carbon together.

18. On page 17 of the response, applicants assert that "additional example 3" (shown on the table on page 10) shows that the use of 20 g of activated carbon and 20g of activated clay together provided more effective caffeine removal, higher catechin concentration and lower absorbance compared to 100g of acid clay alone. Applicants present similar arguments in comparing example 1 with additional comparative example 3.

However, in view of at least, Yuan, who teaches the use of activated carbon for removing color and for removing caffeine, it is not seen to be unexpected to improve on the results where two different types of adsorbents have been employed, compared to when only one type of adsorbent has been employed.

19. On page 18 of the response, applicants assert that since comparative example 4 had a greater caffeine content and lower absorbance that this provides evidence that the concentration of caffeine is not directly proportional to the degree of coloration such that the examiner's speculation as to a reduced caffeine content providing an expectation of a reduced degree of coloration is rebutted.

It is noted however, that it was not asserted that there is a direct and proportional relationship between caffeine content and color, but rather that the art recognized that caffeine plays a factor in the color of the green tea extract. The art teaches that there are other components that contribute to the colors in green tea extracts, such as heavy metals (see paragraph 0024 of Funahashi et al.).

20. Further on page 18 of the response, applicants assert that Niino et al. does not support the conclusion that decreased caffeine content would have reduced the coloration because Niino et al. identifies complexes formed with oxidized polyphenol with caffeine, proteins, pectin or polysaccharides, catalyzed by metal ions to form a complex. Applicants thus assert that since coloration is principally a result of an

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oxidized polyphenol complex, the concentration of caffeine is not demonstrated to be proportional to coloration.

This argument is not persuasive. It is noted that paragraph 0006 states that as the complexes are formed, green tea beverage turns the color from clear to light green to brown. It is noted that “the complexes” refers to the oxidized polyphenol binding with caffeine, proteins, pectin or polysaccharides. Therefore, this would have taught one having ordinary skill that a complex with caffeine can contribute to changing of the color of the green tea extract and thus removal of caffeine so that this complex could not form would also have aided in preventing a change in color of the green tea extract.

21. Further on page 18 of the response, applicants assert that Bailey uses 95% ethanol to desorb catechins from a specific adsorbent and that the aqueous ethanol is not present during the separation of catechins from caffeine. This argument is moot since Yuan and Chang et al. have been relied on to teach that it has been conventional to employ 95% ethanol for removing caffeine from a green tea extract. Additionally, it is noted that the claims only recite contact of the solvent with a green tea extract and adsorbents.

22. On page 19 of the response applicants assert that Funahashi teaches in the examples of employing 40% ethanol and thus there is no disclosure of an ethanol water ratio as claimed. It is noted however, that the art teaches employing 95% ethanol for

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the same purpose as applicants and Funahashi also employs ethanol for purifying a green tea extract. Therefore, to modify Funahashi and employ 95% ethanol when the art also teaches employing 95% ethanol for removing caffeine and undesired precipitates would thus have been an obvious result effective variable, routinely determined through experimentation..

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pan, et al. ("Microwave assisted extraction of tea polyphenols and tea caffeine from green tea leaves") discloses that 95% ethanol extraction has been employed (figure 1). Lin et al. ("Factors Affecting the Levels of Tea Polyphenols and Caffeine in Tea Leaves") also discloses that at 95% ethanol, different levels of various components of green tea can be extracted (see figure 2). JP04-182479 discloses using between 40-90% ethanol for eluting adsorbed components of a green tea extract to obtain high purity tea catechins.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VIREN THAKUR whose telephone number is (571)272-6694. The examiner can normally be reached on Monday through Friday from 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on (571)-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Viren Thakur/
Examiner, Art Unit 1782